TABLE OF CONTENTS

0.1 Circulation List

COPY NO.	COPY HOLDER
1	Research & Development Manager
2	Supply Chain Manager (Procurement)
Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)	

0.2 Amendment Record

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2014-04-24	Cancels and replaces issue No. 1 dated 2003-03-31	Michael Apudo	George Owuor

FOREWORD

This specification has been prepared by the Research and Development Department of The Kenya Power and Lighting Company Limited (abbreviated as KPLC) and it lays down requirements for cable guard. It is intended for use by KPLC in purchasing the items.

1. SCOPE

1.1. This specification is for Cable Guard for use to cover and protect the section of a cable along the pole on power lines.

1.2. This specification covers the following sizes of cable guards:

(i) 38 x 1800 mm (1½" x 6')
(ii) 50 x 2100 mm (2" x 7')
(iii) 75 x 2100 mm (3" x 7')
(iv) 125 x 2100mm (5" x 7')

1.3. The specification stipulates the minimum requirements for cable guard, for use in the company and it shall be the responsibility of the supplier to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the items for The Kenya Power & Lighting Company.

1.4. The specification does not purport to include all the necessary provisions of a contract.

2. REFERENCES

The following standards contain provisions which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) shall apply:

ISO 9364: Continuous hot-dip 55 % aluminium / zinc alloy-coated steel sheet of commercial, drawing and structural qualities.

ISO 9001: Quality management systems – Requirements

ISO 1460: Metallic coatings - Hot dip galvanized coatings on ferrous materials - Determination of the mass per unit area - Gravimetric method

3. TERMS AND DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply.

4. REQUIREMENTS

4.1. Service Conditions

The cable guard shall be suitable for continuous use outdoors in tropical areas in humidity of up to 90%, average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C and saline conditions along the coast.

4.2. Design And Construction

4.2.1. General

4.2.1.1. The cable guard shall be used outdoors to cover and protect the section of a cable mounted at low levels on walls, poles, towers or other related installations on power lines.

4.2.1.2. The cable guard shall be made of steel (*as per clause 4.2.2*) and shall be machine bent to shape (half round, symmetrical), formed into a casing with external flanges for fixing and suitable for intended purpose as per Fig. 1. Sharp edges shall not be permitted.

4.2.1.3. The material of construction shall be 1.2 mm thick aluminum/zinc-coated steel sheet as per ISO 9364. The aluminium/zinc coating shall be tested to ISO 1460 standards and Table 3.

4.2.1.4. The cable guard shall have holes spaced at 300 mm centres on either side for fixing on the pole by use of ordinary nails size 3".

4.2.1.5. The cable guard sizes shall be as follows:

a) **38 x 1800 mm (1½" x 6')** – suitable for covering cables of less than 38mm overall diameter (A = B = 38mm, length = 1800mm).

b) **50 x 2100 mm (2" x 7')** – suitable for covering cables of 38 to 50mm overall diameter (A = B = 50mm, length = 2100mm).

c) **75 x 2100 mm (3" x 7')** – suitable for covering cables of 50 to 75mm overall diameter (A = B = 75mm, length = 2100mm).

d) **125 x 2100 mm (5" x 7')** – suitable for covering cables of over 75mm overall diameter (A = B = 125mm, length = 2100mm).

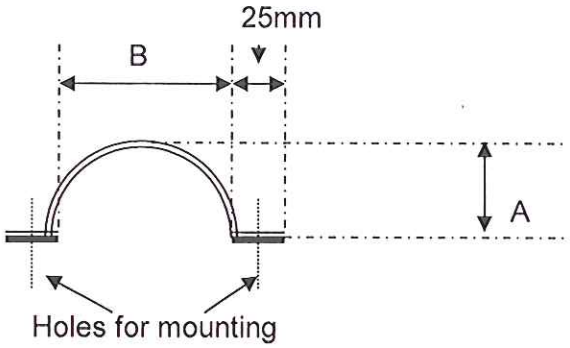

Fig 1: Cable Guard Cross-Section – minimum material thickness: 1.2mm

NOTE: All measurements shall have a tolerance of ±0.15 mm.

4.2.2. **Material**

4.2.2.1. The cable guard shall be manufactured from drawing quality -02; aluminum/zinc-coated steel sheet as per ISO 9364.

4.2.2.2. The steel sheet shall be designated AZ185NC02 with the following characteristics:

a) Aluminium content coating of 55% and coating mass of aluminum/zinc of 185 g/m^2;
b) Coating type N - Normal spangle quality,
c) Surface treatment C - that has undergone mill passivation;
d) Base metal quality 02 – drawing quality.

4.2.2.3. The material chemical, physical and coating properties are as per Table 1, 2, and 3 respectively.

Table 1 – Chemical composition (heat analysis) %

Base metal quality		Carbon	Manganese	Phosphorus	Sulphur
Name	Designation	max.	max.	max.	max.
Drawing	02	0.06	0.50	0.020	0.025

Table 2- Mechanical properties of drawing quality steel

Base Metal Quality		R_e max.[a]	R_m max.	A min.[b] %		
Name	Designation	N/mm^2	N/mm^2	$L_o = 50$ mm	$L_o = 80$ mm	$L_o = 80\sqrt{S_o}$
Drawing	02	300	430	24	23	22

R_e = yield stress
R_m = tensile strength
A = percentage elongation after fracture
L_o = gauge length on test piece
S_o = original cross-sectional area of gauge length

a The yield values apply to 0.2% proof stress if the yield point is not pronounced, otherwise to the lower yield point (R_{eL}).

b For material ≤ 0.60 mm in thickness, the elongation values in the table shall be reduced by 2.

Table 3 - Coating mass test limits for aluminum/zinc-coated steel sheet

Coating designation	Triple-spot test, total both sides min. g/m^2	Single-spot test, total both sides min. g/m^2
AZ185	185	160

NOTE The coating mass in grams per square metre refers to the total coating on both surfaces. Because of the many variables and changing conditions that are characteristic of continuous hot-dip coating, the coating mass is not always evenly divided between the two surfaces of a sheet, neither is the coating evenly distributed from edge to edge. However, it can normally be expected that no less than 40% of the single-spot test limit will be found on either surface.

4.3. Quality Management System

4.3.1. The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the cable guard physical, tests and documentations, will fulfill the requirements stated in the contract documents, standards, specifications and regulations.

4.3.2. The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications shall be submitted with the tender for evaluation.

4.3.3. The bidder shall indicate the delivery time of the items, manufacturer's monthly & annual production capacity and experience in the production of the type and size of items being

offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the cable guard sold in the last five years as well as reference letters from customers shall be submitted with the tender for evaluation.

5. TESTS AND INSPECTION

5.1. The cable guard shall be inspected and tested in accordance with the requirements of the ISO 9364 and ISO 1460 standards and this specification. It shall be the responsibility of the supplier to perform or to have performed all the tests specified.

5.2. Copies of previous Test Reports for the cable guard issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. The accreditation certificate for the third party testing laboratory shall also be submitted with the tender (all in English Language).

5.3. Copies of type test reports to be submitted with the tender (by bidder) for evaluation shall be as stated below:

a) Coating tests (mass and bend)
   - Triple spot tests
   - Single spot tests
   - Coated bend tests

b) Chemical composition (heat analysis)
c) Determination of coating adhesion
d) Tensile tests.(bare metal/structural grade)

5.4. Routine and sample test reports for the cable guards to be supplied shall be submitted to KPLC for approval before shipment/delivery of the goods. KPLC Engineers will witness tests at the factory before shipment.

5.5. Tests to be witnessed by KPLC Engineers at the factory before shipment shall be in accordance with ISO 9364 and ISO 1461 standards and this specification and shall include the following:

a) Dimensional checks
b) Determination of coating mass and surface finish
c) Bend tests
d) Tensile tests

5.6. On receipt of the goods KPLC may perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the cable

guards, which upon examination, test or use; fail to meet any of the requirements in the specification.

6. MARKING AND PACKING

6.1. Marking

The cable guard shall be indelibly marked with the following information:

a) The manufacturer or supplier identity,
b) The designation (coating, coating mass, coating condition, surface treatment and quality or grade of the base metal);
c) The order number or equivalent;
d) The product dimensions in millimetres;
e) The words **"Property of KPLC".**

6.2. Packing

6.2.1. Cable guards shall be delivered packed in bundles of 50 pieces, strapped tightly with a flat galvanized steel bands and completely wrapped in plastic bags to exclude moisture and shall remain sealed until ready for use.

6.2.2. The package shall be clearly marked with the following information;

a) The manufacturer's and/or supplier's identification;
b) Name of country of manufacture;
c) The designation (coating, coating mass, coating condition, surface treatment and quality or grade of the base metal);
d) Dimensions in millimeters;
e) Quantity per box;
f) The words "**Property of KPLC**".

7. DOCUMENTATION

7.1. The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English Language) for tender evaluation shall include the following:

a) Fully filled clause by clause description of the item on offer as per Annex A (Guaranteed Technical Particulars) and signed by the manufacturer;
b) Copies of the Manufacturer's catalogues, brochures, drawings and technical data;

ANNEX A: Guaranteed Technical Particulars *(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records, customer reference letters, details of manufacturing capacity, the manufacturer's experience and copies of complete type test reports for tender evaluation, all in English Language)*

Tender No. .....

Clause number / KPLC Requirements			**Bidder's offer** (indicate full details of the values offered)
Manufacturer's Name and address			
Country of Manufacture			
Bidder's Name and address			
1. Scope			
1.1-1.4			
2. Applicable Standards			
3. Terms & Definitions			
4. Requirements			
4.1. Service conditions			
4.2 Design and construction			
4.2.1 General			
4.2.1.1 – 4.2.1.5 (a-d)			
4.2 Material			
4.2.2.1 – 4.2.2.3			
Chemical composition			
Name of base metal quality			
Designation			
Carbon , % max			
Manganese, % max			
Phosphorus, % max			
Sulphur, % max			
Mechanical properties			
Yield stress		N/mm^2	
Tensile stress		N/mm^2	
Elongation			
• Gauge length on test piece, min	Lo = 50 mm	%	
	Lo = 80 mm	%	
• Original x-sectional area of gauge length, min,	$L_o = 80\sqrt{S_o}$	%	

c) Sales records for the last five years and customer reference letters;
d) Details of manufacturing capacity and the manufacturer's experience;
e) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
g) Manufacturers letter of authorization, quality certificate and other technical documents required in the tender.

7.2. The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

a) Guaranteed Technical Particulars signed by the manufacturer;
b) Design Drawings with details of cable guard to be manufactured for KPLC.
c) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations.
d) Detailed test program to be used during factory testing;
e) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the cable guards for The Kenya Power & Lighting Company;
f) Packaging details and quantity per package.

7.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the cable guards to KPLC stores

----------SPACE LEFT VACANT----------

Clause number / KPLC Requirements			Bidder's offer (indicate full details of the values offered)
Coating mass			
• Coating designation		Ω	
	Triple spot test, min	g/m^2	
	Single spot test	g/m^2	
• Mass of aluminium/zinc, min		%	
4.4Quality Management Systems			
4.4.2 – 4.4.3			Specify
5.0Tests and Inspection			
5.1 – 5.4			Specify
6. Marking & Packaging			
6.1. Marking			Specify
6.2 Packaging			Specify
6.2.1 – 6.2.3			Specify
7. Documentation			
7.1 – 7.3			Specify
8.0	Manufacturer's Guarantee and Warranty		Specify
9.0	List catalogues, brochures, technical data and drawings submitted to support the offer.		Specify
10.0	List customer sales records and reference letters submitted to support the offer.		Specify
11.0	List Test Certificates submitted with tender		Specify
12.0	List test reports of cable guards to be submitted to KPLC for approval before shipment		Specify
13.0	Statement of compliance to specification (indicate deviations if any & supporting documents)		Specify

.....

Manufacturer's Name, Signature, Stamp and Date